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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,835	02/09/2004	Umesh D. Navsariwala	CE12323JAN	9777

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EXAMINER	
JACKSON, BLANE J	
ART UNIT	**PAPER NUMBER**
2618	

DATE MAILED: 04/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/774,835	NAVSARIWALA ET AL.	
	Examiner	Art Unit	
	Blane J. Jackson	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,18 and 19* is/are rejected.

7)☒ Claim(s) *17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadambi et al. (US 6,741,214) in view of Tan et al. (US 6,680,705).

As to claim 1, Kadambi teaches a multiple band antenna comprising:

An RF coupling structure with an *RF drive end and an RF end* (figures 1 and 1c, column 11, line 14 to column 12, line 3: PIFA comprising a single feed and multiple band performance and conductive strip (23) that forms a feed strip connecting the coaxial or drive end to the radiating element (11)),

A resonant RF structure coupled to the RF coupling end, the resonant RF structure having a first end and a second end, the resonant RF structure comprising a conductive perimeter enclosing at least one slot area configured to induce an additional resonant RF band for the resonant RF structure (figure 1c, column 12, line 4 to column 13, line 42: composite slot (46) that physically defines the upper and resonant bands of radiating element (11)).

Kadambi is unclear the feed strip (23) constitutes an RF coupling structure with an RF drive end and *an RF coupling end.*

Tan teaches a multiband Planar Inverted-F Antenna (PIFA), Abstract, figures 2-4. Tan discloses the feed element (203) is detached or separated by a gap from the ground and main radiating element (201) to create capacitive feeding or an RF coupling end to the radiating element, column 2, line 40 to column 3, line 23).

It would have been obvious to one skilled in the art at the time of the invention to recognize the antenna feed of Kadambi may be utilize reactive coupling to the radiating element as taught by Tan where, as part of the design decision, the feed element may be advantageously tuned by varying its dimension or by varying the gap between the main radiating element and the feed element.

As to claim 2, Tan of Kadambi modified teaches the multiple band antenna of claim 1 wherein the RF coupling end is substantially symmetrical (figure 2, column 3, lines 5-14: the feed element (203) may take any shape conforming with a lip portion common to both lips or slot edge of the two resonant antenna parts).

As to claim 3, Kadambi teaches the multiple band antenna of claim 1 wherein the RF coupling structure is *conductively coupled* to the resonant RF structure so as to induce resonance within a pre-selected RF band (figure 1c, column 11, lines 53-58: conductive strip (23)).

As to claim 4, Tan of Kadambi modified teaches the multiple band antenna of claim 1 wherein the RF coupling structure is on a plane that is different from the plane of

the RF resonant structure and further the parts of the RF coupling structure are not on the same planes (figure 2, column 2, line 66 to column 3, line 4: feed element (203) is in a parallel plane and spaced apart form the radiating element (201)).

As to claim 5, Kadambi teaches the multiple band antenna of claim 1 wherein the resonant RF structure is formed from conductors on a printed circuit board (column 1, lines 31-65: the antenna structure is commonly integrated on the circuit card of a wireless device).

As to claim 6, Kadambi teaches the multiple band antenna of claim 1 further comprising a reactive loading tab that substantially bisects one of the at least one slot area, the reactive loading tab conductively connected to the conductive perimeter at two physical points, the two points on opposite sides of the resonant RF structure (figure 2a, column 13, lines 4-25: metal conductive stub (49)).

As to claim 7, Tan of Kadambi modified teaches the multiple band antenna of claim 1 wherein the RF coupling structure is *reactively coupled* to the resonant RF structure so as to induce resonance within a pre-selected RF band (column 3, lines 5-23).

As to claim 8, Tan of Kadambi modified teaches the multiple band antenna of claim 7 wherein the RF coupling structure is *capacitively coupled* to the resonant RF

structure so as to induce resonance within a pre-selected RF band (column 2, line 66 to column 3, line 23).

As to claim 9, Kadambi teaches the multiple band antenna of claim 1 further comprising at least one reactive loading tab that is located within one of the at least one slot area and positioned so as to enhance radiation in one of the additional RF band and further additional RF band (figure 2a, column 13, lines 4-15: stub (49) operates to form radiating element (11) into an inner and outer radiating elements (50) and (51)).

As to claim 10, Kadambi teaches the multiple band antenna of claim 9 wherein the at least one reactive loading tables conductively connected on at least one point to the conductive perimeter (figure 2a, column 13, lines 9-15).

As to claim 11, Kadambi teaches the multiple band antenna of claim 1 further comprising a ground plane reactively coupled to the first end and the second end of the resonant RF structure (figure 1a, column 11, lines 14-42: the ends as well as the edges of slot (46) are capacitively coupled to ground plane (18) as dictated by the structure layout).

As to claim 12, Kadambi teaches the multiple band antenna of claim 11 wherein the RF drive end comprises an interface comprising a first connection to an RF feed and a second connection to at least one of the ground plane or a second RF feed that is

substantially out of phase with the first RF feed (figure 1a, column 11, lines 49-58: coaxial cable (21) feed to the conductive strip (23) with single ended connection to the radiating element (11)).

As to claim 13, Kadambi teaches the multiple band antenna of claim11 wherein the ground plane comprises a conductive area on a first layer of a circuit board and at least one additional conductive layer on another layer of the circuit board (figure 1a, as opposed to the stand alone structure presented, the ground plane (18) may easily be a circuit card for integration into the described cellular device, column 1, lines 30-65).

As to claim 14, 15 and 18, Kadambi teaches a wireless communications device comprising:

At least one of a receiver for wirelessly receiving transmitted signals and a transmitter for wirelessly transmitting signals,

A baseband processing portion, communicatively coupled to the at least one receiver and transmitter for processing at least one of data, voice, image and video signals in order to interface with at least one of the receiver and the transmitter (column 1, lines 30-65),

An antenna communicatively coupled with the at least one of a receiver and a transmitter, the antenna comprising:

An RF coupling structure with an RF drive connection *and an RF coupling end* (figures 1 and 1c, column 11, line 14 to column 12, line 3: PIFA comprising a single feed

and multiple band performance and conductive strip (23) that forms a feed strip connecting the coaxial or drive end to the radiating element (11)),

A resonant RF structure coupled to the RF coupling end, the resonant RF structure having a first end and a second end, the resonant RF structure comprising a conductive perimeter enclosing at least one slot area configured to induce an additional resonant RF band for the resonant RF structure (figure 1c, column 12, line 4 to column 13, line 42: composite slot (46) that physically defines the upper and resonant bands of radiating element (11)).

Kadambi teaches a feed strip (23) which is conductively connected to the RF coupling end but does not teach a resonant RF structure reactively coupled to the RF coupling end.

Tan teaches a multiband Planar Inverted-F Antenna (PIFA), Abstract, figures 2-4. Tan discloses the feed element (203) is detached or separated by a gap from the ground and main radiating element (201) to create capacitive feeding or reactive coupling to the radiating element, column 2, line 40 to column 3, line 23).

It would have been obvious to one skilled in the art at the time of the invention to recognize the antenna feed of Kadambi may be utilize reactive coupling to the radiating element as taught by Tan where, as part of the design decision, the feed element may be advantageously tuned by varying its dimension or by varying the gap between the main radiating element and the feed element.

As to claim 16, Kadambi teaches the wireless device according to claim 15 wherein the at lest one antenna comprises at least one first antenna and at least one second antenna, the at least one first antenna being coupled with the receiver for wireless receiving and the at least one second antenna being coupled with the transmitter for wireless transmitting (figures 4a and 4b, column 17, lines 54-65, single feed three band antenna comprising two cellular bands and one non cellular band such as GPS).

As to claim 19, Kadambi teaches the wireless communication device of claim 18 wherein the first RF coupling end is selectively communicatively coupled with the at least one of a receiver circuit for receiving wireless transmitted signals and with the transmitter circuit for wirelessly transmitting signals (column 1, lines 15-30, application of the multiband antenna in wireless devices).

Allowable Subject Matter

Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nallo et al. (US 6,762,723), Grangeat et al. (US 6,133,880),

Kadambi et al. (US 6,670,923), Kadambi et al. (US 6,856,294) and Hebron et al. (US 6,831,607).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blane J. Jackson whose telephone number is (571) 272-7890. The examiner can normally be reached on Monday through Friday, 9:00 AM-6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJJ

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